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AOSHIMA KEITARO**(54) ORIGINAL PLATE OF PLANOGRAPHIC PRINTING PLATE AND PLANOGRAPHIC PRINTING METHOD****(57)Abstract:**

PROBLEM TO BE SOLVED: To provide a negative type original plate of a planographic printing plate capable of plate-making directly by recording from digital data of a computer or the like using an IR emitting solid laser and a semiconductor laser, excellent in developability on a machine and excellent in printing resistance so as to give a large number of good prints even when heating is not carried out after exposure and to provide a planographic printing method for the printing plate.

SOLUTION: The original plate has a water-soluble or water-dispersible photosensitive layer containing (A) an IR absorbent, (B) a radical polymerization initiator, (C) a radical polymerizable compound and (D) a binder which is preferably water-soluble and has a radical polymerizable functional group on the base and permits recording by irradiation with IR.

LEGAL STATUS

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CLAIMS

[Claim(s)]

[Claim 1] On a base material, (A) infrared absorption agent, the (B) radical polymerization initiator, and (C) radical polymerization nature compound are contained, and it has the sensitization layer which is water solubility or water-dispersion, and is the lithography version original edition recordable [with an infrared exposure].

[Claim 2] The lithography version original edition according to claim 1 characterized by containing the (D) binder in said sensitization layer.

[Claim 3] The lithography version original edition according to claim 2 with which the aforementioned (D) binder is characterized by having the functional group of radical polymerization nature.

[Claim 4] On a base material, (A) infrared absorption agent and the (B) radical polymerization initiator, (C) A radical polymerization nature compound is contained and it can record by infrared exposure. And after equipping a printing machine with the lithography version original edition which comes to prepare the sensitization layer which is water solubility or water-dispersion and exposing it in the image on a printing machine, Or the lithography approach characterized by equipping a printing machine, supplying an aquosity component and oily ink and printing this lithography version original edition, without passing through a development process after exposing in the image with infrared laser before equipping a printing machine.

[Translation done.]

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to the printing approach of the lithography version of having used the lithography version original edition and it. It is related with the lithography approach using the lithography version original edition which can carry out direct platemaking and in which the so-called direct platemaking is possible, and this lithography version original edition in which development on board is possible by scanning infrared laser in a detail based on the digital signal of a computer etc.

[0002]

[Description of the Prior Art] Generally, the lithography version consists of the oleophilic image section which receives ink in a printing process, and the non-image section of the hydrophilic property which receives dampening water. With such lithography, the property which water and oil based ink repel mutually is used. After producing and cheating out of the adhesive difference in ink on a version front face, using the ink acceptance section and the non-image section of a hydrophilic property as the dampening water acceptance section (ink non-receiving section) for the oleophilic image section and making ink impress only on the image section, it is the approach of imprinting and printing ink to printing hands-ed, such as paper, and the PS plate which prepared the oleophilic photopolymer layer on the hydrophilic base material is used widely conventionally. As that platemaking approach, after exposing the lithography version original edition through subject copies, such as a lith film, the approach of making a sensitization layer remain in the image section, carrying out dissolution clearance of the non-image section with a developer, and exposing an aluminum substrate front face is applied, and the desired printing version has usually been obtained by this approach.

[0003] In the platemaking process in the conventional PS plate, the process which carries out dissolution clearance of the non-image section with the developer according to a sensitization layer etc. is required after exposure, and unnecessary-ization or being simplified are one technical problem about processing such wet [additional]. Especially, since disposal of the waste fluid discharged in connection with a wet process from consideration of earth environment serves as big concerns of the whole industrial world, the request [in this field] of an improvement is still stronger in recent years.

[0004] As one of the simple platemaking approaches according to this want, negatives are developed on a printing machine after exposure using the sensitization layer which can remove the non-image section of the original edition for the printing versions in the usual printing process, and the method of obtaining the final printing version is proposed. The platemaking method of the lithography version by such approach is called an on-board development method. The method of performing dynamic clearance by the activity of a sensitization layer meltable to dampening water or an ink solvent and contact to the impression cylinder in a printing machine or a blanket cylinder as the concrete approach, for example etc. is mentioned. however -- until after exposure equips a printing machine with the on-board developing-negatives method of an image recording method for having used conventional ultraviolet rays and the conventional light since it is not fixed to a sensitization layer for example, -- the original edition -- perfect -- a

protection-from-light condition or constant temperature -- the approach time-consuming [of saving on conditions] needed to be taken.

[0005] The digitization technique which uses a computer, and accumulates [processes it and] and outputs image information electronically as another trend of this field in recent years on the other hand has spread widely, and the new image type of output corresponding to such a digitization technique is used increasingly variously. In connection with this, the image information digitized by radiant ray of high astringency like a laser beam is supported, scan exposure of the original edition is carried out with this light, and the computer toeplate technique of manufacturing the direct printing version through a lith film attracts attention. It has been an important technical technical problem to obtain the original edition for the printing versions which was adapted for this object in connection with it. Therefore, the simplification of a platemaking activity, dry-type-izing, and no processing-ization are strongly desired also compared with the former from the above-mentioned environmental side and both sides of adaptation-izing to digitization.

[0006] As the manufacture approach of the printing version by the scan exposure which is easy to include in a digitization technique, promising ** of the platemaking approach of using such laser as an image recording means especially is carried out from the ability of the thing of high power to obtain now cheaply by solid state laser, such as semiconductor laser and an YAG laser, recently. Physical-properties change of the image of the original edition side by the platemaking approach of the conventional method, give image Mr. exposure of a low - inside illuminance to the photosensitive original edition, and according to photochemical reaction Although image recording is performed, by the approach using the exposure of a high-power consistency using high power laser, carry out concentration irradiation of the light energy of a large quantity to ultrashort time amount to an exposure field, transform light energy into heat energy efficiently, thermal changes, such as a chemical change, a phase change, and a gestalt, change of structure, are made to cause with the heat, and the change is used for image recording. That is, image recording is recorded by the reaction by heat energy although image information is inputted by light energies, such as laser light. Usually, it is calling it light-and-heat conversion to change heat mode record, a call, and light energy into heat energy for the recording method using generation of heat by such high-power consistency exposure.

[0007] The image which did not expose the big advantage of the platemaking approach using a heat mode record means with the light of usual illuminance level like indoor lighting, and was recorded by high illuminance exposure has fixation in it not being indispensable. That is, if a heat mode sensitized material is used for image recording, before exposure, it is safe to indoor light, and fixation of an image is not indispensable after exposure. If the platemaking process which removes the exposed sensitization layer in the image using the sensitization layer which follows , for example , is insolubilized or solubilized by heat mode exposure , and is used as the printing version carries out with an on board development method , even if exposed to a certain time amount and indoor ambient light after image exposure , it will become that it is possible in a printing system so that an image may not win popularity in effect in development , i.e. , clearance of the non-image section . Therefore, if heat mode record is used, it is also expected that it becomes possible to obtain the desirable original edition for the lithography versions to an on-board development method.

[0008] On the other hand, as for development of the laser in recent years, **** better **, the solid state laser which emits 1200nm infrared radiation from the wavelength of 760nm especially, and semiconductor laser can come to hand [high power and a small thing] now easily. As the record light source at the time of engraving directly from digital data, such as a computer, such laser is dramatically useful. However, since sensitization wavelength is a light region 760nm or less, many practically useful photosensitive record ingredients cannot carry out image recording in such infrared laser. For this reason, an ingredient recordable [with infrared laser] is desired.

[0009] As an image recording ingredient recordable [with such infrared laser], the record ingredient which consists of an infrared absorption agent, an acid generator, resol resin, and novolak resin is indicated by US No. 5,340,699. However, such an image recording ingredient of a negative mold needs heat-treatment after laser exposure for image formation, and, for this

reason, it asked for the image recording ingredient of the negative mold which does not need the heat-treatment after exposure. for example , although the record ingredient which change from the compound which have the cyanine dye , the yaw DONIMU salt , and the ethylene nature partial saturation double bond which have specific structure , and in which an addition polymerization be possible to JP,7-103171,B and which do not need the heat-treatment after image Mr. exposure be indicated , this image recording ingredient have the low reinforcement of the formed image section , for example when it use as a lithography version , it have the problem that where of little the number of sheets of the print obtain at the time of printing be . Moreover, the lithography version original edition which prepared the sensitization layer which distributed the particle of a thermoplastic hydrophobic polymer in the hydrophilic binder polymer on the hydrophilic base material is indicated by the patent registration No. 2938397 official report. After carrying out infrared laser exposure of this lithography version original edition, making this official report coalesce with heat and carrying out image formation of the particle of a thermoplastic hydrophobic polymer to it, the purport in which development on board is possible is indicated by installation, dampening water, and/or ink in the version on the printing machine cylinder. Thus, although the approach of forming an image with coalesce by the mere heat welding of a particle showed good on-board development nature, since image reinforcement was weak, it had the problem that print durability was inadequate.

[0010]

[Problem(s) to be Solved by the Invention] Therefore, digital data, such as a computer, to direct record is possible for the object of this invention by recording using the solid state laser and semiconductor laser which emit infrared radiation, and even if it can be engraved, without performing wet-developing processing and does not heat-treat after exposure, a good print is to offer the negative-mold lithography version original edition excellent in the print durability obtained several many sheets. the wet-developing processing such the lithography version original edition was used for whose further object of this invention -- it is in offering the unnecessary lithography approach.

[0011]

[Means for Solving the Problem] this invention person came to complete a header and this invention for the ability of the above-mentioned object to be attained wholeheartedly paying attention to the constituent of the negative-mold sensitization layer in the lithography version original edition by adopting the configuration in which the dissolution or distribution is possible for the sensitization layer itself in water, and it can form the firm image section in it by infrared laser exposure as a result of examination. That is, the negative-mold lithography version original edition of this invention is characterized by containing (A) infrared absorption agent, the (B) radical polymerization initiator, and (C) radical polymerization nature compound, and being able to record by infrared exposure on a base material, and having the sensitization layer which is water solubility or water-dispersion. In the sensitization layer concerning this invention, it is desirable to contain (D) binder polymer further from a viewpoint of the improvement in membraneous, and it is still more desirable in it that the (D) binder polymer is the compound of polymerization nature, i.e., the mode which has the functional group of radical polymerization nature in intramolecular. Moreover, the lithography approach concerning claim 4 of this invention On a base material, (A) infrared absorption agent and the (B) radical polymerization initiator, (C) A radical polymerization nature compound is contained and it can record by infrared exposure. And after equipping a printing machine with the lithography version original edition which comes to prepare the sensitization layer which is water solubility or water-dispersion and exposing it in the image on a printing machine, Or after exposing in the image with infrared laser before equipping a printing machine, a printing machine is equipped and it is characterized by supplying an aquosity component and oily ink and printing this lithography version original edition, without passing through a development process.

[0012]

[Embodiment of the Invention] Hereafter, this invention is explained to a detail. The negative-mold lithography version of this invention is characterized by for the record possibility of, i.e., the exposure section, being able to harden by infrared exposure, and being able to form a

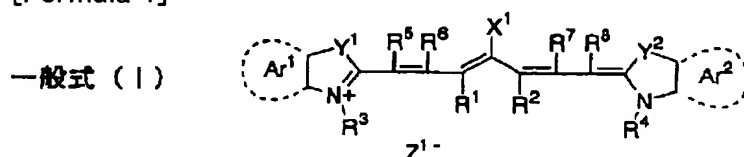
hydrophobic (oleophilic) field on a base material, and having the sensitization layer which is water solubility or water-dispersion (this property may only be hereafter called "water solubility" in this invention). "The sensitization layer which is water solubility or water-dispersion" means the sensitization layer which has the solubility or the distributed clearance nature to the dampening water which is the aqueous component used for printing, is in the condition immersed in the water solution of pH 2-8 at the room temperature, and specifically points out the condition remove [dissolution-] or remove [distributed-] a sensitization layer, and get, by [physical] rubbing and giving a process in this invention. In order for a sensitization layer to be water solubility or water-dispersion, as for each constituent of the viewpoint of the improvement in water-soluble to an image recording ingredient, it is desirable that it is required to have the property distributed easily in water solubility or water, and itself is water solubility further, or the film formation component of lamination uses what a front face distributes easily by the hydrophilic property at water in the case of water-insoluble nature. Below, sequential explanation of each of that constituent is given.

[0013] The lithography version original edition of [(A) infrared absorption agent] this invention has the configuration in which image recording is possible by the laser which emits infrared radiation. It is desirable to use an infrared absorption agent for such a sensitization layer of the lithography version. The infrared absorption agent has the function to change the absorbed infrared radiation into heat. Under the present circumstances, with the generated heat, (B) radical generating agent decomposes, a radical is generated, of that radical, the polymerization reaction of (C) radical polymerization nature compound advances, and the image section is formed. Although there will be especially no limit if it is the matter which has the function which the infrared absorption agent used in this invention absorbs infrared radiation, and is changed into heat, the color which absorbs 1200nm infrared radiation effectively from the wavelength of 760nm, a pigment, or a metal particle is mentioned preferably especially. The infrared absorption color of water solubility [viewpoint / of excelling in water solubility or water-dispersion especially], the pigment of the infrared absorption nature by which surface hydrophilization processing was carried out, a metal particle, etc. are desirable.

[0014] As a color, the well-known thing indicated by reference, such as a commercial color and a "color handbook" (the Society of Synthetic Organic Chemistry, Japan edit, Showa 45 annual publications), can be used. Specifically, the thing of a publication can be mentioned to paragraph number [of JP,10-39509,A] [0050] - [0051]. As a desirable thing, cyanine dye, SUKUWARIRIUMU coloring matter, pyrylium salt, and a nickel thio rate complex are especially mentioned among these colors. Furthermore, cyanine dye is desirable and the cyanine dye shown especially by the following general formula (I) is the most desirable.

[0015]

[Formula 1]



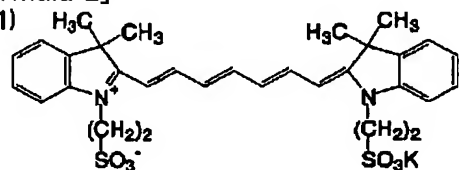
[0016] X1 shows a halogen atom or X2-L1 among a general formula (I). Here, X2 shows an oxygen atom or a sulfur atom, and L1 shows the hydrocarbon group of the carbon atomic numbers 1-12. R1 and R2 show the hydrocarbon group of the carbon atomic numbers 1-12 independently, respectively. Especially the thing for which it is desirable that it is the hydrocarbon group of two or more carbon atomic numbers as for R1 and R2, R1 and R2 are mutually combined further from the preservation stability of sensitization layer coating liquid, and five membered-rings or six membered-rings are formed is desirable. even if Ar1 and Ar2 are the same respectively, they may differ from each other, and they show the aromatic hydrocarbon radical which may have the substituent. even if Y1 and Y2 are the same respectively, they may differ from each other, and they show the dialkyl methylene group of a sulfur atom or 12 or less carbon atomic numbers. even if R3 and R4 are the same respectively, they may differ from each

other, and they show the hydrocarbon group of 20 or less carbon atomic numbers which may have the substituent. As a desirable substituent, the alkoxy group of 12 or less carbon atomic numbers, a carboxyl group, and a sulfonic group are mentioned. even if R5, R6, R7, and R8 are the same respectively, they may differ from each other, and they show a hydrogen atom or the hydrocarbon group of 12 or less carbon atomic numbers. From the availability of a raw material, it is a hydrogen atom preferably. Moreover, Z1- shows a pair anion. However, when the sulfonic group is permuted by either R1-R8, it is unnecessary in Z1-. Desirable Z1- is the halogen ion from preservation stability, the perchloric acid ion, the tetrafluoroborate ion, hexafluorophosphate ion, and sulfonic-acid ion of sensitization layer coating liquid, and is perchloric acid ion, hexafluoro phosphate ion, and aryl sulfonic-acid ion especially preferably. [0017] As what is preferably used for this invention also in an infrared absorption color, while being able to add to homogeneity in hydrophilic matrices, such as hydrophilic resin of a sensitization layer, the water-soluble infrared absorption color which has the property easily dissolved bywater is mentioned. Although the desirable example [(IR-1) - (IR-11)] of a water-soluble infrared absorption color is shown below, this invention is not restricted to these.

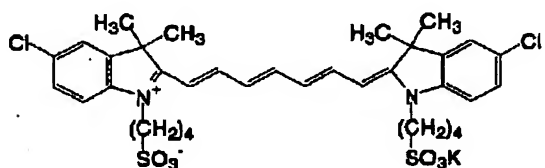
[0018]

[Formula 2]

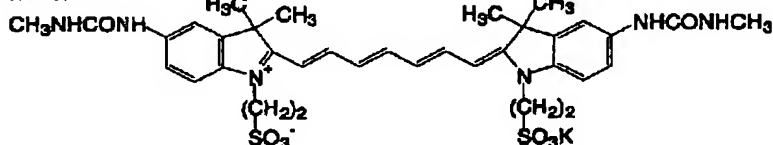
(IR-1)



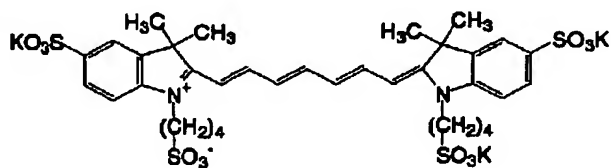
(IR-2)



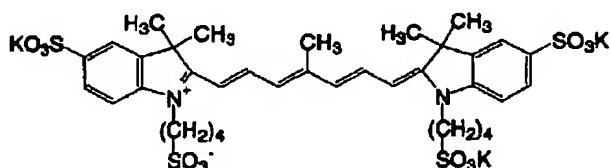
(IR-3)



(IR-4)

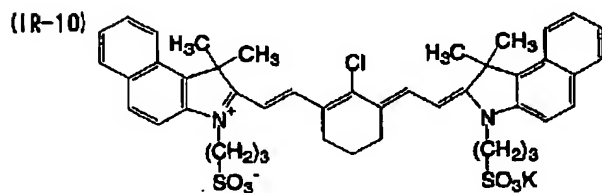
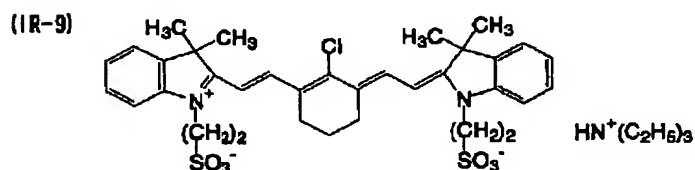
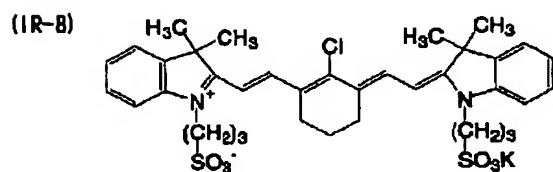
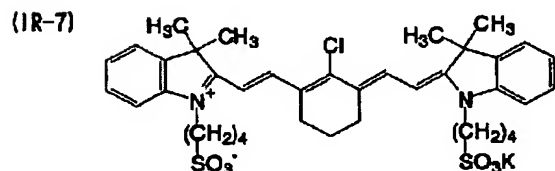
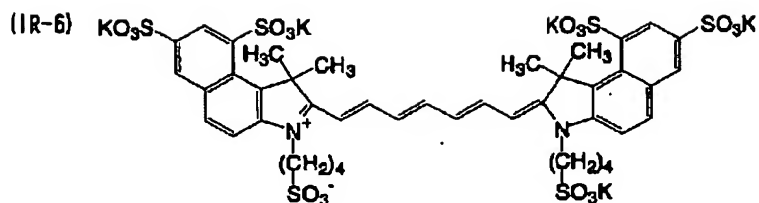


(IR-5)



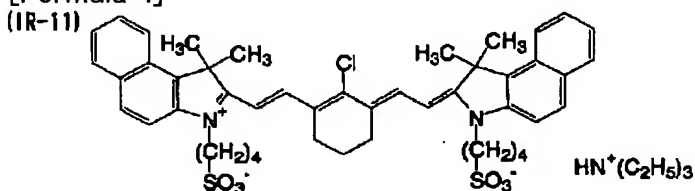
[0019]

[Formula 3]



[0020]

[Formula 4]



[0021] As a pigment used in this invention, the pigment indicated by a commercial pigment and a Color Index (C. I.) handbook, the "newest pigment handbook" (volume for Japanese pigment American Institute of Technology, 1977 annual publications), the "newest pigment applied technology" (CMC publication, 1986 annual publications), "printing ink technical" CMC publication, and 1984 annual publications can be used.

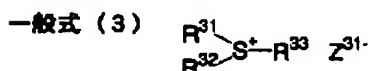
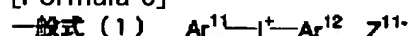
[0022] As a class of pigment, a black pigment, a yellow pigment, an orange pigment, brown pigments, red pigments, a purple pigment, a blue pigment, green pigments, a fluorescent pigment, a metallic flake pigment, and other polymer joint coloring matter are mentioned. The detail of these pigments is indicated by paragraph number [of JP,10-39509,A] [0052] - [0054] at the detail, and can apply these also to this invention. These pigments have that desirable by which the surface hydrophilization processing finger was carried out from a viewpoint of the improvement in water-dispersion of the homogeneity dispersibility in a water-soluble sensitization layer and a sensitization layer. Only one sort may be used for these infrared absorption agents, and they may use two or more sorts together.

[0023] An infrared absorption agent can be especially added at 1 – 10% of the weight of a rate preferably 0.1 to 20% of the weight 0.01 to 50% of the weight to the total solids of a sensitization layer. Sensibility becomes it low that an addition is less than 0.01 % of the weight, and if it exceeds 50 % of the weight, the reinforcement of the image section will become weak, and it is in the inclination for print durability to fall. Moreover, when the sensitization layer containing an infrared absorption agent is created, it is desirable that the optical density in the absorption maximum in an infrared field is between 0.1–3.0. When it separates from this range, there is an inclination for sensibility to become low. Since optical density is determined by the addition of said infrared absorption agent, and the thickness of a sensitization layer, predetermined optical density is obtained by controlling both conditions. The optical density of a sensitization layer can be measured with a conventional method. As a measuring method, the sensitization layer of the thickness by which the coverage after desiccation was suitably determined in the range required as a lithography version on transparency or a white base material is formed, a sensitization layer is formed on the base material of reflexivity, such as the approach of measuring with the optical-density plan of a transparency mold, and aluminum, and the approach of measuring reflection density etc. is mentioned, for example.

[0024] Although the triazine compound which can choose and use a well-known photopolymerization initiator, a thermal polymerization initiator, etc. as a [(B) Radical polymerization initiator] radical polymerization initiator, for example, has an onium salt and a trihalomethyl group, a peroxide, an azo system polymerization initiator, an organic boron compound, an azide compound, quinone diazide, etc. are mentioned, from a viewpoint of record sensibility, an onium salt and an organic boron compound are desirable. Specifically as an onium salt, iodonium salt, diazonium salt, sulfonium salt, etc. are mentioned. Although these onium salts also have a function as an acid generator, in order to use together with (C) radical polymerization nature compound mentioned later, they function as an initiator of a radical polymerization in this invention. The onium salts suitably used in this invention are iodonium salt, diazonium salt, and sulfonium salt. In this invention, these onium salts function not as an acid generator but as an initiator of a radical polymerization. The onium salt suitably used in this invention is an onium salt expressed with following general formula (1) – (3).

[0025]

[Formula 5]



[0026] Ar¹¹ and Ar¹² show independently the aryl group of 20 or less carbon atomic numbers which may have the substituent among a formula (1), respectively. As a desirable substituent in case this aryl group has a substituent, a halogen atom, a nitro group, a carboxyl group, a sulfone radical, a cyano group, hydroxyl, the alkyl group of 12 or less carbon atomic numbers, the alkoxy group of 12 or less carbon atomic numbers, or the aryloxy group of 12 or less carbon atomic numbers is mentioned. Z¹¹⁻ expresses halogen ion, perchloric acid ion, tetrafluoroborate ion, hexafluorophosphate ion, and the counter ion chosen from the group which consists of sulfonic-acid ion, and is perchloric acid ion, hexafluoro phosphate ion, and aryl sulfonic-acid ion preferably. Ar²¹ shows the aryl group of 20 or less carbon atomic numbers which may have the substituent among a formula (2). As a desirable substituent, a halogen atom, a nitro group, a carboxyl group, a sulfone radical, a cyano group, hydroxyl, the alkyl group of 12 or less carbon atomic numbers, the alkoxy group of 12 or less carbon atomic numbers, the aryloxy group of 12 or less carbon atomic numbers, the alkylamino radical of 12 or less carbon atomic numbers, the dialkylamino radical of 12 or less carbon atomic numbers, the arylamino radical of 12 or less

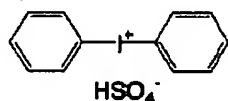
carbon atomic numbers, or the diaryl amino group of 12 or less carbon atomic numbers is mentioned. Z21- expresses the counter ion of Z11- and homonymy. among a formula (3), even if R31, R32, and R33 are the same respectively, they may differ from each other, and they show the hydrocarbon group of 20 or less carbon atomic numbers which may have the substituent. As a desirable substituent, a halogen atom, a nitro group, a carboxyl group, a sulfone radical, a cyano group, hydroxyl, the alkyl group of 12 or less carbon atomic numbers, the alkoxy group of 12 or less carbon atomic numbers, or the aryloxy group of 12 or less carbon atomic numbers is mentioned. Z31- expresses the counter ion of Z11- and homonymy.

[0027] In this invention, as an onium salt which can be used suitably, it can add to homogeneity in hydrophilic matrices, such as hydrophilic resin of a sensitization layer, and a water-soluble onium salt is mentioned from a viewpoint of not spoiling the water solubility of a sensitization layer. Although the desirable example of a water-soluble onium salt is shown below, this invention is not restricted to these. In addition, the water-soluble onium salt - [---3] is indicated to be by the general formula (2) and water-soluble onium salt and instantiation compound [---1] compound [instantiation] [OS-1] - [OS-4] instantiation compound [OI-1] - [OI-2] is indicated to be by the general formula (1) are an onium salt shown by the general formula (3) among the following compounds.

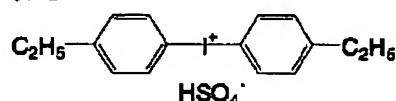
[0028]

[Formula 6]

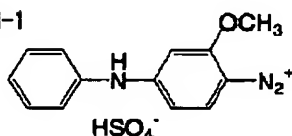
OI-1



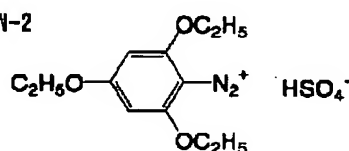
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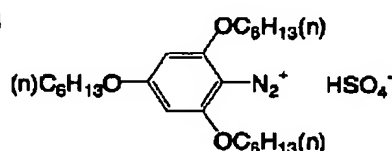
ON-1



ON-2



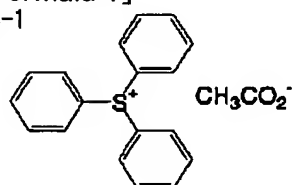
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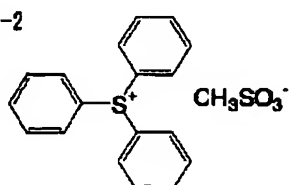
[0029]

[Formula 7]

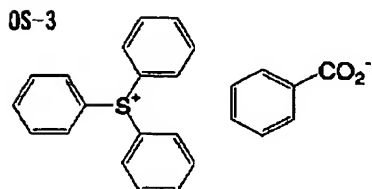
OS-1



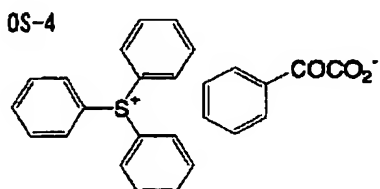
OS-2



OS-3



OS-4

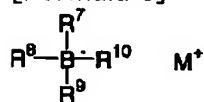


[0030] As radical polymerization initiators other than an onium salt, the organic boron compound

expressed with the following general formula (4) is used preferably. An organic boron compound can make an exposure field generate a radical locally and efficient according to concomitant use with an infrared absorption agent. By using together the organic coloring matter which has absorption to infrared wavelength light especially, sensitization can be carried out to the light of this wavelength, and the record using the light source of this wavelength becomes it is desirable and possible.

[0031]

[Formula 8]



一般式 (4)

[0032] R7, R8, R9, and R10 express an aliphatic series radical, an aromatic series radical, a heterocycle radical, or -Si (R11) (R12) (R13) independently among a general formula (4), respectively, and R11, R12, and R13 express an aliphatic series radical and an aromatic series radical independently, respectively. Moreover, an annular aliphatic series radical or a chain-like aliphatic series radical is sufficient as said aliphatic series radical. The chain-like aliphatic series radical may have branching. When R7-R10 express an aliphatic series radical, as this aliphatic series radical, for example, an alkyl group, an alkenyl radical, an alkynyl group, or an aralkyl radical is mentioned, especially, an alkyl group, an alkenyl radical, and an aralkyl radical are desirable, and especially an alkyl group is desirable.

[0033] Said illustrated alkyl group may have the substituent. As a substituent which can be introduced A carboxyl group, a sulfonic group, a cyano group, a halogen atom, a hydroxy group, A with a carbon number of 30 or less alkoxy carbonyl group, a with a carbon number of 30 or less alkyl sulfonylamino carbonyl group, An aryl sulfonylamino carbonyl group, an alkyl sulfonyl group, an aryl sulfonyl group, The with a carbon number of 30 or less acylamino sulfonyl group, a with a carbon number of 30 or less alkoxy group, A with a carbon number of 30 or less alkylthio group, a with a carbon number of 30 or less aryloxy group, A nitro group, a with a carbon number of 30 or less alkyl group, alkoxy carbonyloxy group, Aryloxy carbonyloxy group, a with a carbon number of 30 or less acyloxy radical, a with a carbon number of 30 or less acyl group, a carbamoyl group, a sulfamoyl group, a with a carbon number of 30 or less aryl group, the amino group, the permutation amino group, a permutation ureido radical, a permutation phosphono radical, a heterocycle radical, etc. are mentioned. Two or more [in said general formula (4) and of R7 R8, R9, and R10] may connect through direct or a substituent, and it may form the ring.

[0034] As the anion section of said general formula (4), for example Tetramethyl borate, Tetraethyl borate, tetrabutyl borate, TORIISO butyl methyl borate, Di-n-butyl-G t-butyl borate, tree m-chlorophenyl-n-hexyl borate, Triphenylmethyl borate, triphenyl ethyl borate, triphenyl propyl borate, Triphenyl-n-butyl borate, TORIMESHI chill butyl borate, Tritolyl isopropyl borate, triphenyl benzyl borate, Tetra--m-fluoro benzyl borate, triphenyl phenethyl borate, Triphenyl-p-chloro benzyl borate, triphenyl ethenyl butyl borate, JI (alpha-naphthyl)-dipropyl borate, triphenyl silyl triphenyl borate, TORITORUIRU silyl triphenyl borate, tree n-butyl (dimethylphenyl silyl) borate, Diphenyl dihexyl borate, tree m-fluoro phenyl hexyl borate, Tori (5-chloro-4-methylphenyl) hexyl borate, tree m-fluoro phenyl cyclohexyl borate, tree (5-fluoro-2-methylphenyl) hexyl borate, etc. are mentioned.

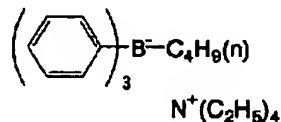
[0035] M+ expresses the radical which can form a cation among said general formula (4). Especially, an organic cationic compound, transition-metals coordinated complex cations (compound given in JP,2791143,B etc.), or metal cations (for example, Na+, K+, Li+, Ag+, Fe2+, Fe3+, Cu+, Cu2+, Zn2+, aluminum3+, 1/2calcium2+, etc.) are desirable. When the 4th class ammonium cation, the 4th class pyridinium cation, the 4th class quinolinium cation, a phosphonium cation, an iodonium cation, a sulfonium cation, a coloring matter cation, etc. are mentioned and the coloring matter cation of the cation section has absorption in an infrared region as said organic cationic compound, for example, this organic boron compound will have the function of the both sides of (A) infrared absorption agent and the (B) radical polymerization initiator.

[0036] Although the desirable example ([alumnus-1] - [alumnus-4]) of a water-soluble organic boron compound is shown below, this invention is not restricted to these.

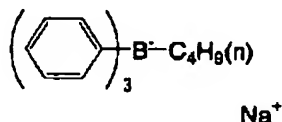
[0037]

[Formula 9]

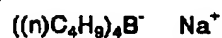
0B-1



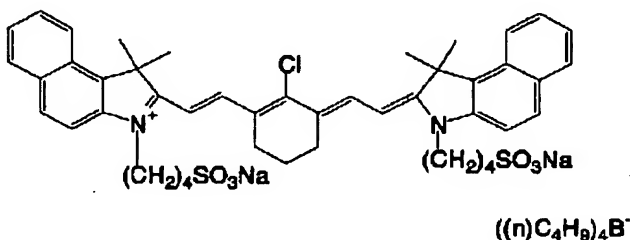
0B-2



0B-3



0B-4



[0038] As for the radical polymerization initiator used in this invention, it is desirable that absorption maximum wavelength is 400nm or less, and it is desirable that it is 360 nm or less. Thus, the handling [an image recording ingredient] under a white light by making absorption wavelength into an ultraviolet-rays field.

[0039] Only one sort may be used for these radical polymerization initiators, and they may use two or more sorts together. A radical polymerization initiator can be especially added in an image recording ingredient at 1 - 20% of the weight of a rate preferably 0.5 to 30% of the weight 0.1 to 50% of the weight to image recording ingredient total solids. Sensibility becomes it low that an addition is less than 0.1 % of the weight, and if 50 % of the weight is exceeded, the reinforcement of the image section will become weak, and it is in the inclination for print durability to fall.

[0040] The radical polymerization nature compound used for [(C) radical polymerization nature compound] this invention is a radical polymerization nature compound which has the ethylene nature partial saturation double bond of a piece at least, and is chosen from the compound which has preferably at least one end ethylene nature unsaturated bonds [two or more]. Such a compound group is widely known in the industrial field concerned, and can use these without definition especially in this invention. The polymer which introduced the cross-linking functional group into the compound illustrated by for example, a monomer, a prepolymer, i.e., a dimer, a trimer and oligomer or those mixture and those copolymers, or the (D) binder mentioned later can be used for these. As an example of a monomer and its copolymer, unsaturated carboxylic acid (for example, an acrylic acid, a methacrylic acid, an itaconic acid, a crotonic acid, isocrotonic acid, a maleic acid, etc.), and the ester and amides are raised, and the ester of unsaturated carboxylic acid and an aliphatic series polyhydric-alcohol compound and the amides of unsaturated carboxylic acid and an aliphatic series multiple-valued amine compound are used preferably. Moreover, a dehydration condensation reaction object with the carboxylic acid of the addition reaction object of the unsaturated-carboxylic-acid ester and the amides which have nucleophilicity substituents, such as hydroxyl, and an amino group, a sulfhydryl group, monofunctional or polyfunctional isocyanates, and epoxy, monofunctional, or many organic functions etc. is used suitably. Moreover, a substitution reaction object with the addition reaction object of the unsaturated-carboxylic-acid ester or the amides which has electrophile nature substituents, such as an isocyanate radical and an epoxy group, and the alcohols of monofunctional or many organic functions, amines and thiols, the unsaturated-carboxylic-acid

ester which has desorption nature substituents, such as a halogen radical and a tosyloxy radical, further or amides, and the alcohols of monofunctional or many organic functions, amines and thiols is also suitable. Moreover, it is also possible as another example to use the compound group replaced with partial saturation phosphonic acid, styrene, etc. instead of the above-mentioned unsaturated carboxylic acid.

[0041] As an example of the radical polymerization nature compound which is ester of an aliphatic series polyhydric-alcohol compound and unsaturated carboxylic acid As acrylic ester, ethylene glycol diacrylate, triethylene glycol diacrylate, 1,3-butanediol diacrylate, tetramethylene glycol diacrylate, Propylene glycol diacrylate, neopentyl glycol diacrylate, Trimethylolpropane triacrylate, the TORIMECHI roll pro pantry (acryloyloxypropyl) ether, Trimethylol triacrylate, hexanediol diacrylate, 1, 4-cyclohexane diol diacrylate, tetraethylene glycol diacrylate, Pentaerythritol diacrylate, a pentaerythritol thoria chestnut rate, Pentaerythritol tetraacrylate, dipentaerythritol diacrylate, Dipentaerythritol hexaacrylate, a sorbitol thoria chestnut rate, There are sorbitol tetraacrylate, sorbitol pentaacrylate, sorbitol hexa acrylate, Tori (acryloyloxyethyl) isocyanurate, polyester acrylate oligomer, etc.

[0042] As methacrylic ester, tetramethylene glycol dimethacrylate, Triethylene glycol dimethacrylate, neopentyl glycol dimethacrylate, Trimethylolpropanetrimethacrylate, trimethylolthane trimethacrylate, Ethylene glycol dimethacrylate, 1,3-butanediol dimethacrylate, Hexanedioldimethacrylate, pentaerythritol dimethacrylate, Pentaerythritol trimethacrylate, pentaerythritol tetra-methacrylate, Dipentaerythritol dimethacrylate, dipentaerythritol hexamethacrylate, There are sorbitol trimethacrylate, sorbitol tetra-methacrylate, screw [p-(3-metacryloxy-2-hydroxy propoxy) phenyl] dimethylmethane, screw-[p-(methacrylic oxyethoxy) phenyl] dimethylmethane, etc.

[0043] As itaconic-acid ester, there are ethylene glycol di-itaconate, propylene glycol di-itaconate, 1,3-butanediol di-itaconate, 1,4-butanediol di-itaconate, tetramethylene glycol di-itaconate, pentaerythritol di-itaconate, sorbitol tetra-itaconate, etc.

[0044] As crotonic-acid ester, there are ethylene GURIKORUJI crotonate, tetramethylene glycol JIKUROTNETO, pentaerythritol JIKUROTNETO, sorbitol TETORAJI crotonate, etc.

[0045] As isocrotonic acid ester, there are ethylene glycol JIISO crotonate, pentaerythritol JIISO crotonate, sorbitol tetrapod iso crotonate, etc.

[0046] As a maleate, there are ethylene glycol JIMARETO, triethylene glycol JIMARETO, pentaerythritol JIMARETO, sorbitol tetra-malate, etc.

[0047] As an example of other ester, JP,46-27926,B, JP,51-47334,B, fatty alcohol system ester given in JP,57-196231,A, JP,59-5240,A, JP,59-5241,A, the thing that has an aromatic series system frame given in JP,2-226149,A, the thing containing the amino group given in JP,1-165613,A, etc. are used suitably.

[0048] Moreover, as an example of the monomer of the amide of an aliphatic series multiple-valued amine compound and unsaturated carboxylic acid, there are methylenebis-acrylamide, methylenebis-methacrylamide, 1, 6-hexa methylenebis-acrylamide, 1, 6-hexa methylenebis-methacrylamide, diethylenetriamine tris acrylamide, xylylene bis-acrylamide, xylylene bis-methacrylamide, etc.

[0049] As an example of other desirable amide system monomers, a thing with xylene structure can be raised to cyclo given in JP,54-21726,B.

[0050] The urethane system addition polymerization nature compound manufactured using the addition reaction of isocyanate and a hydroxyl group is also suitable. Moreover, as such an example To for example, the poly isocyanate compound which has two or more isocyanate radicals in one molecule indicated in JP,48-41708,B The vinyl urethane compound containing two or more polymerization nature vinyl groups etc. is mentioned into 1 molecule to which the vinyl monomer containing the hydroxyl group shown by the following formula (5) was made to add.

[0051] General formula (5) $\text{CH}_2=\text{C}(\text{R}_{41})\text{COOCH}_2\text{CH}(\text{R}_{42})\text{OH}$ (however, R_{41} and R_{42} show H or CH_3 .)

[0052] Moreover, urethane acrylate which is indicated by JP,51-37193,A, JP,2-32293,B, and JP,2-16765,B, and the urethane compounds which have JP,58-49860,B, JP,56-17654,B, JP,62-39417,B, and an ethyleneoxide system frame given in JP,62-39418,B are suitable.

[0053] Furthermore, the radical polymerization nature compounds which is indicated by JP,63-277653,A, JP,63-260909,A, and JP,1-105238,A and which have amino structure and sulfide structure in intramolecular may be used.

[0054] As other examples, acrylate and methacrylate of many organic functions, such as JP,48-64183,A, JP,49-43191,B, JP,52-30490,B, polyester acrylate that are indicated by each official report, and epoxy acrylate the epoxy resin and the acrylic acid (meta) were made to react to, can be raised. Moreover, a specific unsaturated compound JP,46-43946,B, JP,1-40337,B, and given in JP,1-40336,B, a vinyl phosphonic acid system compound given in JP,2-25493,A, etc. can be raised. Moreover, in a certain case, the structure containing a perfluoro-alkyl group given in JP,61-22048,A is used suitably. Furthermore, it is a Japanese adhesion association magazine, vol.20 and the thing currently introduced to No.7,300-308 page (1984) as a photoresist monomer and oligomer can also be used.

[0055] About these radical polymerization nature compounds, the detail of operation how whether it is used independently, using what kind of structure or it using together, and an addition are can be set as arbitration in accordance with the engine-performance design of a final record ingredient. For example, it is chosen from the following viewpoints. In respect of sensibility, when structure with many partial saturation radical contents per molecule is desirable and many, two or more organic functions are this better **. Moreover, in order to make high reinforcement of the image section, i.e., the hardening film, the thing of three or more organic functions is good, and the approach of adjusting both photosensitivity and reinforcement by using combining the compounds (for example, an acrylic ester system compound, a methacrylic ester system compound, a styrene system compound, etc.) which have the different number of organic functions and a different different polymerization nature machine also has it. [still more effective]

[0056] In this invention, in order to require that a sensitization layer is water solubility, also as for the radical polymerization nature compound which participates in the physical properties of a sensitization layer, it is desirable to use a water-soluble thing. As a water-soluble radical polymerization nature compound, the monomer which has the functional group of a hydrophilic property, oligomer, a polymer, etc. are mentioned to a principal chain, a side chain, or an end. Although the water-soluble radical polymerization nature compound ([M-1] - [M-4]) which can be used for below suitable for this invention is illustrated, this invention is not restricted to these.

[0057]

[Formula 10]



[0058] Also to compatibility with other components in a sensitization layer (for example, a binder polymer, a radical polymerization initiator, a coloring agent, etc.), and dispersibility, its selection and usage are important factors, for example, according to the activity of a low purity compound, and concomitant use of a two or more sort compound, a radical polymerization nature compound may raise compatibility and it may deal in it. About the compounding ratio of the radical polymerization nature compound in a sensitization layer, although more ones are advantageous in sensibility, when many [too], the phase separation which is not preferably arises or the problem on the production process by the adhesiveness of a sensitization layer (for example, the poor

manufacture originating in the imprint of a sensitization layer component and adhesion) etc. may be produced. In many cases, from these viewpoints, the desirable compounding ratio of a radical polymerization nature compound is 20 – 75 % of the weight preferably five to 80% of the weight to all the components (solid content) that constitute a sensitization layer. Moreover, these may be used independently or may be used together two or more sorts.

[0059] In [(D) binder polymer] this invention, it is desirable from a viewpoint of the improvement in membraneous to use a binder polymer for a sensitization layer further. as a binder -- a line -- it is desirable to use an organic polymer. such -- " -- a line -- as organic polymer", a well-known thing can be used for arbitration. In order that a sensitization layer may require that it is water solubility, as a binder, as for the lithography version original edition of this invention, the hydrophilic resin which is fusibility or bloating tendency is chosen as water. If hydrophilic resin is used for a binder, water development is attained and may discover the outstanding on-board development nature. As hydrophilic resin used for this invention, what has hydrophilic groups, such as hydroxyl, a carboxyl group, a hydroxyethyl radical, a hydroxypropyl radical, an amino group, an aminoethyl radical, an aminopropyl radical, a carboxymethyl radical, and a sulfone radical, for example is desirable.

[0060] As an example of a binder, gum arabic, casein, gelatin, a starch derivative, A carboxymethyl cellulose and its sodium salt, cellulose acetate, Sodium alginate, vinyl acetate-maleic-acid copolymers, and styrene-maleic-acid copolymers Polyacrylic acid and those salts, polymethacrylic acid, and those salts, The homopolymer and copolymer of hydroxyethyl methacrylate, The homopolymer and copolymer of the homopolymer of hydroxyethyl acrylate and a copolymer, and hydroxy PIROPIRU methacrylate, The homopolymer and copolymer of hydroxypropyl acrylate, The homopolymer and copolymer of hydroxy butyl methacrylate, The homopolymer of hydroxy butyl acrylate and a copolymer, and polyethylene glycols Whenever [hydroxy propylene polymers, polyvinyl alcohol and hydrolysis] At least 60 % of the weight, Preferably At least 80% of the weight of hydrolysis polyvinyl acetate, The homopolymer of a polyvinyl formal, a polyvinyl butyral, a polyvinyl pyrrolidone, and acrylamide and a copolymer, the homopolymer of methacrylamide and a polymer, the homopolymer of N-methylol acrylamide, a copolymer, etc. can be mentioned.

[0061] As for a binder, it is desirable to have cross-linking. What is necessary is just to introduce cross-linking functional groups, such as an ethylene nature unsaturated bond, into the principal chain of a macromolecule, or a side chain, in order to give cross-linking to a binder component. A cross-linking functional group may be introduced by copolymerization. As an example of the polymer which has an ethylene nature unsaturated bond, Polly 1, 4-butadiene, Polly 1, 4-isoprene, nature, and synthetic rubber can be mentioned into the principal chain of a molecule. Into the side chain of a molecule, as an example of the polymer which has an ethylene nature unsaturated bond, it is the ester of an acrylic acid or a methacrylic acid, or the polymer of an amide, and the polymer in which the residue ($-\text{COOR}$ or R of $-\text{CONHR}$) of ester or an amide has an ethylene nature unsaturated bond can be mentioned.

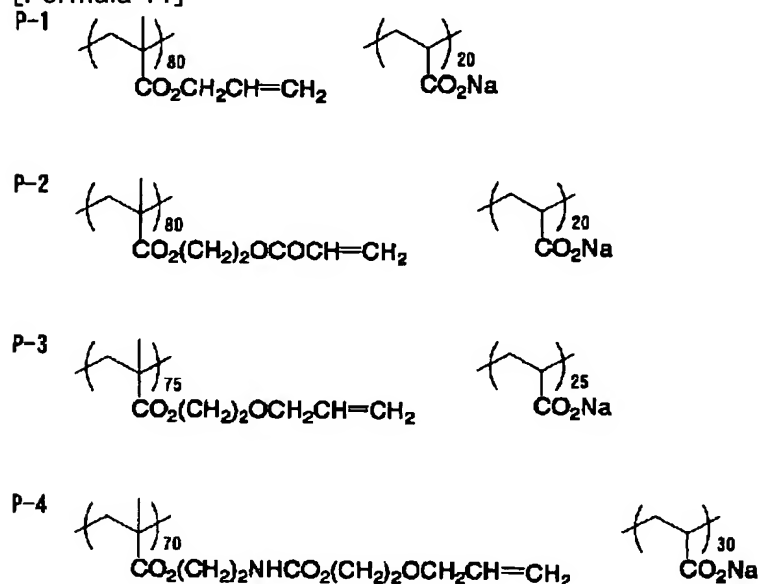
[0062] As an example of the residue (the above-mentioned R) which has an ethylene nature unsaturated bond - $\text{CH}_2 \text{ n-} \text{CR}_1=\text{CR two R}_3$, $-(\text{CH}_2\text{O}) \text{ n-} \text{CH}_2\text{CR}_1=\text{CR two R}_3$, $-(\text{CH}_2\text{CH}_2\text{O}) \text{ n-} \text{CH}_2\text{CR}_1=\text{CR two R}_3$, $-(\text{CH}_2) \text{ n-NH-CO-O-CH}_2\text{CR}_1=\text{CR two R}_3$, $-(\text{CH}_2) \text{ n-O-CO-CR}_1=\text{CR two R}_3$ and $-(\text{CH}_2\text{CH}_2\text{O})_2\text{-X}$ ($\text{R}_1\text{-R}_3$ -- respectively -- a hydrogen atom --) A halogen atom and a carbon atomic number The alkyl group of 1-20, an aryl group, an alkoxy group, an aryloxy group -- it is -- R_1 , and R_2 or R_3 -- mutual -- joining together -- a ring -- you may form -- n -- the integer of 1-10 -- it is -- and X -- dicyclopentadienyl residue -- it is -- it can mention. $-\text{CH}_2 \text{ CH}=\text{CH}_2$ (JP,7-21633,B publication), $-\text{CH}_2\text{CH}_2 \text{ O-CH}_2 \text{ CH}=\text{CH}_2$, $-\text{CH}_2\text{C}(\text{CH}_3)=\text{CH}_2$, $-\text{CH}_2 \text{ CH}=\text{CH-C}_6\text{H}_5$, $-\text{CH}_2\text{CH}_2 \text{ OCOCH}=\text{CH-C}_6\text{H}_5$, $-\text{CH}_2\text{CH}_2\text{-NHCOO-CH}_2 \text{ CH}=\text{CH}_2$, and $-\text{CH}_2\text{CH}_2 \text{ O-X}$ (X is dicyclopentadienyl residue) are contained in the example of ester residue. $-\text{CH}_2 \text{ CH}=\text{CH}_2$ and $-\text{CH}_2\text{CH}_2\text{-1-Y}$ (Y is cyclohexene residue) and $-\text{CH}_2\text{CH}_2\text{-OCO-CH}=\text{CH}_2$ are contained in the example of amide residue. A free radical (a polymerization initiation radical or growth radical of the polymerization process of a polymerization nature compound) adds to the unsaturated bond radical, addition polymerization is carried out through the polymerization chain of a direct or polymerization nature compound between polymers, bridge formation is formed

between polymer molecules, and the above cross-linking polymers are hardened. Or when the atom in a polymer (for example, hydrogen atom on the carbon atom which adjoins an unsaturated bond radical) is drawn out by the free radical, a polymer radical generates and it joins together mutually, bridge formation is formed between polymer molecules and it hardens.

[0063] Although the water-soluble binder polymer ([P-1] - [P-4]) which can be used for below suitable for this invention is illustrated, this invention is not restricted to these.

[0064]

[Formula 11]



[0065] It is 5000 or more preferably about the weight average molecular weight of the binder polymer used by this invention, and is the range of 10,000-300,000 still more preferably, and it is 1000 or more preferably about number average molecular weight, and is the range of 2000-250,000 still more preferably. One or more is desirable still more desirable, and the range of polydispersed degree (weight average molecular weight/number average molecular weight) is 1.1-10. Although any are sufficient as a random polymer, block polymer, a graft polymer, etc., as for these polymers, it is desirable that it is a random polymer.

[0066] The polymer used by this invention is conventionally compoundable by the well-known approach. As a solvent used in case it compounds, for example A tetrahydrofuran, Ethylene dichloride, a cyclohexanone, a methyl ethyl ketone, an acetone, A methanol, ethanol, ethylene glycol monomethyl ether, Ethylene glycol monoethyl ether, 2-methoxy ethyl acetate, Diethylene-glycol wood ether, 1-methoxy-2-propanol, 1-methoxy-2-propyl acetate, N,N-dimethylformamide, N,N-dimethylacetamide, toluene, ethyl acetate, methyl lactate, ethyl lactate, dimethyl sulfoxide, water, etc. are mentioned. These solvents are independent, or two or more sorts are mixed and they are used.

[0067] As a radical polymerization initiator used in case the polymer used by this invention is compounded, well-known compounds, such as an azo system initiator and a peroxide initiator, can be used.

[0068] The binder polymer used by this invention may be used independently, or it may mix and it may be used. These polymers are preferably added at 30 - 90% of the weight of a rate 20 to 95% of the weight to sensitization layer total solids. When an addition is less than 20 % of the weight and image formation is carried out, the reinforcement of the image section runs short. Moreover, image formation is not carried out when an addition exceeds 95 % of the weight. moreover, the compound and line which have the ethylene nature partial saturation double bond in which a radical polymerization is possible -- as for an organic polymer, it is desirable to consider as the range of 1 / 9 - 7/3 by the weight ratio.

[0069] In [other component] this invention, various compounds may be further added if needed in addition to these in a sensitization layer. For example, the color which has big absorption in a

light region can be used as a coloring agent of an image. Specifically Oil yellow #101, oil yellow #103, oil pink #312, the oil green BG Oil blue BOS, oil blue #603, oil black BY, Oil black BS, oil black T-505 (above product made from ORIENT Chemical industry), Victoria pure blue, a crystal violet (CI42555), Colors indicated by JP,62-293247,A, such as Methyl Violet (CI42535), ethyl violet, rhodamine B (CI145170B), Malachite Green (CI42000), and a methylene blue (CI52015), can be mentioned. Moreover, pigments, such as a phthalocyanine system pigment, an azo system pigment, carbon black, and titanium oxide, can also be used suitably.

[0070] It is more desirable to add, since distinction of the image section and the non-image section tends to attach these coloring agents after image formation. In addition, an addition is 0.01 – 10% of the weight of a rate to image recording ingredient total solids.

[0071] Moreover, in this invention, in order to prevent the unnecessary thermal polymerization of the compound which has the ethylene nature partial saturation double bond in which a radical polymerization is possible during manufacture of a sensitization layer, or preservation of the lithography version original edition, it is desirable to add a small amount of thermal polymerization inhibitor. As a suitable thermal polymerization inhibitor, hydroquinone, p-methoxy phenol, G t-butyl-p-cresol, pyrogallol, t-butyl catechol, a benzoquinone, 4,4'-thiobis (3-methyl-6-t-butylphenol), 2,2'-methylene bis (4-methyl-6-t-butylphenol), an N-nitroso-N-phenyl hydroxylamine aluminum salt, etc. are mentioned. The addition of a thermal polymerization inhibitor has about 0.01 % of the weight – about 5 desirable % of the weight to the weight of all constituents. Moreover, if needed, in order to prevent the polymerization inhibition by oxygen, behenic acid, a higher-fatty-acid derivative like a behenic acid amide, etc. may be added, and you may make it unevenly distributed in the front face of a sensitization layer in process of desiccation after spreading. About 0.1 % of the weight – about 10% of the weight of all the constituents of the addition of a higher-fatty-acid derivative are desirable.

[0072] Moreover, in the image recording ingredient in this invention, since the stability of the processing to development conditions is extended, an amphoteric surface active agent which is indicated by a nonionic surface active agent which is indicated by JP,62-251740,A and JP,3-208514,A, JP,59-121044,A, and JP,4-13149,A can be added.

[0073] As an example of a nonionic surface active agent, sorbitan tristearate, sorbitan monopalmitate, a sorbitan trio rate, a stearin acid monoglyceride, the polyoxyethylene nonylphenyl ether, etc. are mentioned.

[0074] As an example of an amphoteric surface active agent, alkyl di(aminoethyl)glycine, alkylpolyamino ethylglycine hydrochloride, 2-alkyl-N-carboxy ethyl-N-hydroxyethyl-imidazolium-betaine, N-tetradecyl-N, and N-betaine mold (for example, trade name Amogen K, the product made from the first Industry) etc. is mentioned.

[0075] The rate of occupying in the image recording ingredient of the above-mentioned nonionic surface active agent and an amphoteric surface active agent has 0.05 – 15 desirable % of the weight, and it is 0.1 – 5 % of the weight more preferably.

[0076] Furthermore, into the image recording ingredient of this invention, if needed, in order to give the flexibility of a paint film etc., a plasticizer is added. For example, a polyethylene glycol, tributyl citrate, a diethyl phthalate, dibutyl phthalate, phthalic-acid dihexyl, a dioctyl phthalate, tricresyl phosphate, tributyl phosphate, trioctyl phosphate, tetrahydrofurfuryl oleate, etc. are used.

[0077] What is necessary is to usually melt each above-mentioned component to a solvent, and just to apply on a suitable base material, in order to form a sensitization layer with the lithography version original edition of this invention. As a solvent used here, ethylene dichloride, a cyclohexanone, A methyl ethyl ketone, a methanol, ethanol, propanol, ethylene glycol monomethyl ether, 1-methoxy-2-propanol, 2-methoxy ethyl acetate, 1-methoxy-2-propyl acetate, dimethoxyethane, methyl lactate, Although ethyl lactate, N,N-dimethylacetamide, N,N-dimethylformamide, tetramethyl urea, N-methyl pyrrolidone, dimethyl sulfoxide, a sulfolane, gamma-butyl lactone, toluene, water, etc. can be mentioned, it is not limited to this. these solvents are independent — or it is mixed and used. The concentration of the above-mentioned component in a solvent (total solids containing an additive) is 1 – 50 % of the weight preferably.

[0078] Moreover, speaking of the lithography version original edition, generally, the coverage

(solid content) of the sensitization layer on the base material obtained after spreading and desiccation is 0.5 – 5.0 g/m², although it changes with applications. It is desirable. Although apparent sensibility becomes size as coverage decreases, the coat property of the image recording film falls. As an approach of applying, although various approaches can be used, bar coating-machine spreading, revolution spreading, spray spreading, curtain spreading, DIP spreading, the Ayr knife spreading, blade spreading, roll coating, etc. can be mentioned, for example.

[0079] In the sensitization layer coating liquid in this invention, the surfactant for improving spreading nature, for example, a fluorochemical surfactant which is indicated by JP,62-170950,A, can be added. A desirable addition is 0.05 – 0.5 % of the weight still more preferably 0.01 to 1% of the weight among [all] image recording ingredient solid content.

[0080] In the lithography version original edition of [base material] this invention as a base material which can apply said sensitization layer It is a tabular object stable in dimension, and if it has required reinforcement, flexibility, etc., there will be especially no limit. for example, paper and plastics (for example, polyethylene and polypropylene —) the paper which polystyrene etc. laminated, and a metal plate (for example, aluminum —) plastic films (for example, diacetyl cellulose —), such as zinc and copper A cellulose triacetate, cellulose propionate, a butanoic acid cellulose, a cellulose acetate butyrate, Paper or a plastic film etc. with which the metal like the above, such as a cellulose nitrate, polyethylene terephthalate, polyethylene, polystyrene, polypropylene, a polycarbonate, and a polyvinyl acetal, was laminated or vapor-deposited is mentioned. Polyester film or an aluminum plate is mentioned as a desirable base material.

[0081] As a base material used for the lithography version original edition of this invention, it is lightweight and it is desirable to use the aluminum plate excellent in surface treatment nature, workability, and corrosion resistance. As aluminum construction material with which this object is presented, it is JIS. 1050 material, JIS 1100 material, JIS 1070 material, an aluminum-Mg system alloy, an aluminum-Mn system alloy, an aluminum-Mn-Mg system alloy, aluminum-Zr system alloy. An aluminum-Mg-Si system alloy etc. is mentioned.

[0082] An aluminum plate can perform surface treatment, such as split-face-ized processing, on a front face, can apply a sensitization layer, and can use it as the lithography version original edition. to split-face-ized processing, the formation of a mechanical split face, the formation of a chemical split face, and the formation of an electrochemical split face are independent — or it is carried out by combining. Moreover, it is also desirable to perform processing for performing anodizing for securing a surface hard one with a crack, or rising.

[0083] The surface treatment of a base material is explained below. It precedes split-face-izing an aluminum plate, and cleaning processing by the surfactant, the organic solvent, or the alkaline water solution in order to remove surface rolling oil may be performed if needed. In the case of alkali, subsequently, neutralization, desmutting, etc. may be processed with an acidic solution.

[0084] Subsequently, in order to make adhesion of a base material and a sensitization layer good and to give water retention to the non-image section, the so-called graining processing which split-face-izes the front face of a base material is made. There is the chemical graining approach of split-face-ization-processing a front face by the etching agent which there are the mechanical graining approaches, such as sandblasting, and consists of alkali, acids, or those mixture as a concrete means of this graining approach. Moreover, well-known approaches, such as the split-face-ized approach which is made to stick by pressure the approach of making paste up a granule on the electrochemical graining approach and a base material ingredient by the approach of having adhesives or its effectiveness, and split-face-izing a front face, the continuous band which has detailed irregularity, and a roll to a base material ingredient, and imprints irregularity, are applicable.

[0085] These split-face-ized approaches [like] may be performed combining plurality, and the sequence, the number of repeats, etc. can be chosen as arbitration. Since smut is generating to the above split-face-ized processings, i.e., the front face of a base material obtained by doing graining processing of, in order to remove this smut, generally it is desirable to process rinsing or alkali etching suitably.

[0086] In order to raise abrasion resistance, chemical resistance, and water retention, an oxide

film is made to usually form in a base material by anodic oxidation, after performing the above pretreatments in the case of the aluminum base material used for this invention.

[0087] If a porosity oxide film is formed as an electrolyte used for anodizing of an aluminum plate, anythings can be used and, generally a sulfuric acid, a phosphoric acid, oxalic acid, chromic acids, or these mixed acids will be used. The concentration of those electrolytes is suitably decided according to an electrolytic class. Since the processing conditions of anodic oxidation change variously with the electrolyte to be used, it cannot generally specify, but generally, electrolytic concentration is suitable for them, if 1 – 80% solution and solution temperature are in 5–70 degrees C, current density 5 – 60 A/dm², electrical potential differences 1–100V, and the range for 10 seconds – electrolysis time amount 5 minutes. Although two or more 1.0 g/m is suitable for the amount of an anodic oxide film, it is the range of 2.0–6.0g/m² more preferably. Print durability is inadequate in anodic oxide films being less than two 1.0 g/m, or it becomes easy to produce the so-called “blemish dirt” with which a blemish becomes easy to stick to the non-image section of the lithography version with, and ink adheres to the part of a blemish at the time of printing.

[0088] As a property desirable as a base material for the lithography versions, it is 0.10–1.2 micrometers in arithmetical mean deviation of profile. If lower than 0.10 micrometers, a sensitization layer and adhesion will fall, and remarkable lowering of **–proof will be produced. When larger than 1.2 micrometers, the dirt nature at the time of printing will get worse. An image will become [in / when blacker than 0.65 / furthermore as the depth of shade of a base material, are 0.15–0.65 as a reflection density value, when whiter than 0.15, the halation at the time of image exposure is too strong, cause trouble to image formation, and / the ** version activity after development] hard to see ** and what has remarkably bad *****.

[0089] Such an aluminum base material can be used after anodizing with the application of the under coat of the processing or sensitization layer spreading by the organic acid or its salt.

[0090] The interlayer for raising the adhesion of a [interlayer] base material and a sensitization layer may be prepared. Generally for improvement in adhesion, the middle class consists of diazo resin, a phosphoric-acid compound which sticks to aluminum. An interlayer's thickness must be arbitrary, and when it exposes, it must be the upper sensitization layer and the thickness which can perform a uniform bonding reaction. Usually, the spreading rate of about one to 100 mg/m² is good by the desiccation solid-state, and especially 5 – 40 mg/m² is good. The operating percentage of the diazo resin in the middle class is 60 – 100% preferably 30 to 100%.

[0091] After the above processings or under coats etc. are performed to a support surface, a back coat is established in the rear face of a base material if needed. The enveloping layer which consists organic [an organic high molecular compound given in JP,5–45885,A and given in JP,6–35174,A] or inorganic metallic compounds of hydrolysis and a metallic oxide which is made to carry out a polycondensation and is obtained as this back coat is used preferably.

[0092] The lithography version original edition of this invention can be created as mentioned above. Next, the lithography approach of this invention is explained. The lithography version original edition of said this invention is exposed by the image with infrared laser, and the sensitization layer in the exposure section hardens it. On the other hand, since it has the property of water solubility [layer / concerning this invention / sensitization / itself], in order to dissolve and distribute easily for an aquosity component, even if the unexposed section does not perform a development wet [by water or the alkali developer], by the aquosity component supplied in process of printing, the unexposed section is removed easily and platemaking completes it.

[0093] [Exposure] This lithography version original edition is recordable with infrared laser. Moreover, the thermal record by the ultraviolet ray lamp or the thermal head is also possible. In this invention, it is desirable that image exposure is carried out by the solid state laser and semiconductor laser which emit 1200nm infrared radiation from the wavelength of 760nm. The output of laser has desirable 100mW or more, and in order to shorten the exposure time, it is desirable to use a multi-beam laser device. Moreover, as for the exposure time per pixel, it is desirable that it is less than 20 microseconds. As for the energy irradiated by the record ingredient, it is desirable that it is 10 – 500 mJ/cm².

[0094] After the exposure process by [printing] infrared laser, without passing through any wet-developing processing, a printing machine can be equipped with the lithography version original edition of this invention, and it can be printed as it is. Or a printing machine can be equipped with the lithography version original edition of this invention, exposure on board can be performed, and it can also print as it is. A printing machine is equipped with the printing version original edition exposed by the image with infrared laser, without passing through development processes, such as wet-developing down stream processing, and if an aqueous component and oily ink are supplied and printing is started, in the exposure section (heating unit) of a sensitization layer, the sensitization layer hardened with heat will form the oily ink acceptance section which has an oleophilic front face. In the unexposed section, the aqueous component supplied on the version dissolves or removes [distributed] the sensitization layer which is water solubility, and a hydrophilic front face is exposed in the part. An aqueous component adheres on the exposed hydrophilic front face (unexposed field), an oil-based-ink component is impressed on the sensitization layer of an exposure field, and printing is started. Here, as the aqueous component supplied and oily ink, dampening water and the oily ink for printing are usually mentioned. the lithography version is covered over the offset press etc. by such processing -- having -- as it is -- many -- it can use for printing of several sheets.

[0095]

[Example] Hereafter, although an example explains this invention to a detail, this invention is not limited to these.

(Examples 1-6)

Defecation processing was performed and the molten metal of JIS A1050 alloy containing the aluminum beyond [creation of base material] 99.5%, Fe 0.30% and Si 0.10%, Ti 0.02%, and Cu 0.013% was cast. In order to remove unnecessary gas, such as hydrogen in a molten metal, degasifying processing was carried out, and ceramic-tube filter processing was carried out to defecation processing. Casting was performed by the direct chill casting process. 10mm facing of the ingot of 500mm of solidified board thickness was carried out from the front face, and homogenization was performed at 550 degrees C for 10 hours so that an intermetallic compound might not make it big and rough. Subsequently, after hot-rolling at 400 degrees C and carrying out intermediate annealing for 500-degree-C 60 seconds all over a continuous annealing furnace, cold rolling was performed and it considered as the aluminum rolled plate with a plate pressure of 0.30mm. By controlling the granularity of a reduction roll, center line average surface roughness Ra after cold rolling was controlled to 0.2 micrometers. Then, in order to raise smoothness, it applied to the tension leveler.

[0096] Next, surface treatment for considering as the lithography version base material was performed. First, in order to remove the rolling oil on the front face of an aluminum plate, the sodium aluminate water solution performed indirect desulfurization fat processing for 50-degree-C 30 seconds 10%, and the sulfuric-acid water solution performed the period sum and desmutting processing for 50-degree-C 30 seconds 30%.

[0097] Subsequently, in order to make adhesion of a base material and a sensitization layer good and to give water retention to the non-image section, the so-called graining processing which split-face-izes the front face of a base material was performed. 1% of nitric acid and the water solution containing 0.5% of amyl nitrate were kept at 45 degrees C, and electrolysis graining was performed by giving anode side quantity of electricity 240 C/dm² for an aluminum web by the indirect feed cell with a sink into a water solution by current density 20 A/dm² and the alternation wave of duty ratio 1:1. The sodium aluminate water solution performed etching processing for 50-degree-C 30 seconds 10% after that, and the 30% sulfuric-acid water solution performed the period sum and desmutting processing for 50-degree-C 30 seconds.

[0098] In order to raise abrasion resistance, chemical resistance, and water retention furthermore, the oxide film was made to form in a base material by anodic oxidation. The anodic oxide film of 2.5 g/m² was created by performing electrolysis processing by direct current of 14 A/dm² by the indirect feed cell, having used 20% water solution of sulfuric acids at 35 degrees C as an electrolyte, and ****(ing) an aluminum web in an electrolyte.

[0099] Then, silicate processing was performed in order to secure the hydrophilic property as

the printing version non-image section. Processing was ****(ed) so that 1.5% water solution of No. 3 silicate of soda might be kept at 70 degrees C and the contact time of an aluminum web might become 15 seconds, and it was rinsed further. The coating weight of Si was 10 mg/m². Ra (center line surface roughness) of the base material created by the above was 0.25 micrometers.

[0100] The following under coat liquid was applied to a [under coat], next this aluminum base material with the wire bar, and it dried for 30 seconds at 90 degrees C using the warm air type dryer. The amount of coating after desiccation was 10 mg/m².

[0101]

<Under coat liquid> - ethyl methacrylate and 2-acrylamide-2-methyl-1- Copolymer of the mole ratio 75:15 of propane sulfonic-acid sodium salt 0.1g - 2-aminoethylphosphonic acid 0.1g - methanol 50g - ion exchange water 50g [0102] The [sensitization layer], next the following solution [P] were adjusted, and after adjusting this solution, the wire bar was immediately used for the aluminum plate [finishing / the above-mentioned under coat], and it applied, it dried for 45 seconds at 115 degrees C with the warm air type dryer, and plate for negative-mold lithography [P-1] - [P-6] was obtained. The amount of coats after desiccation was 1.3 g/m². Under the present circumstances, the infrared absorption agent and radical polymerization initiator which were used are shown in a table 1. In addition, a radical polymerization initiator [alumnus-4] has a cyanine dye frame in the cation section which is the counter ion of a borate anion, and this cation section achieves the function as an infrared absorption agent. When the reflection density in the absorption maximum in the infrared field of the sensitization layer of these lithography version original editions was measured, all were between 0.6-1.2.

[0103]

<Solution [P]> - infrared absorption agent (compound given in a table 1) 0.10g - radical polymerization initiator (compound given in a table 1) 0.30g - monomer (compound given in a table 1) 1.00g - binder (compound given in a table 1) 1.00g Naphthalene sulfonate of - Victoria pure blue 0.04g - fluorochemical surfactant 0.01g (Sir chlorofluocarbon S-113, Asahi Glass Co., Ltd. make)

- Water 27.0g [0104]

[A table 1]

	赤外線吸収剤	ラジカル 重合開始剤	ラジカル重合性 化合物	バインダー
実施例1	IR-7	OI-1	M-1	P-1
実施例2	IR-7	ON-1	M-1	P-1
実施例3	IR-7	OS-1	M-4	P-1
実施例4	IR-7	OB-1	M-4	P-1
実施例5	IR-9	ON-1	M-4	P-2
実施例6	OB-4		M-1	P-2

[0105] Plate for negative-mold lithography [P-1] [exposure] Obtained - [P-6] was exposed on condition that output 9W, outside drum rotational frequency 210rpm, printing plate energy 100 mJ/cm², and resolution 2400dpi in Trendsetter 3244VFS made from Creo which carried water cooling type 40W infrared semiconductor laser.

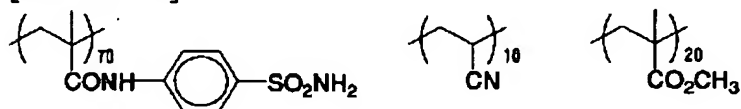
[0106] Lithography version [P-1] - [P-6] was attached in Hy Dell Berg printing machine Hy Dell SOR-M after [printing] exposure, without carrying out a development, and commercial oil based ink (GEOS-G Japanese ink N) was printed using the 1 capacity % water solution of dampening water EU-3 (Fuji Photo Film Co., Ltd. make). Dampening water was supplied first, subsequently ink was supplied, and printing was started. Under the present circumstances, when viewing estimated whether dirt would be generated in the non-image section of a print, as for dirt, neither of the lithography versions was accepted. Furthermore, there is no printing dirt to 50,000 sheets, and the quality print with good impression nature was obtained.

[0107] (Example 1 of a comparison) In the solution [P] used in said example 1, it replaced with

the binder polymer [P-1], and the polymer which has the meltable following structure in water-insoluble nature and an alkali water solution was used, and also the lithography version original edition [Q] was obtained like the example 1. Although the sensitization layer of the lithography version original edition [Q] is alkali water-solution fusibility, it is not water solubility or water-dispersion. When printed by exposing the obtained lithography version original edition [Q] like an example 1, the non-image section was not removed thoroughly, but the greasing occurred, and a good print was not able to be obtained.

[0108]

[Formula 12]



[0109] Thus, the lithography version original edition of this invention equipped with the water-soluble or water-dispersion sensitization layer, Although it has the on-board development nature which was excellent in all, and the good print was obtained and being excelled also in print durability, the thing of water-insoluble nature was used for the binder polymer, it was inferior to on-board development nature, the dirt of the non-image section resulting from the residual membrane of poor development was generated, and the lithography version original edition of the example of a comparison which formed in water the sensitization layer which is not fusibility was not able to obtain a good print.

[0110]

[Effect of the Invention] Even if according to this invention digital data, such as a computer, to direct record is possible and it does not perform heat-treatment at the time of image formation by recording using the solid state laser and semiconductor laser which emit infrared radiation, the lithography version original edition excellent in the on-board development nature which equips a printing machine with as it is and which can be printed can be offered without obtaining several good many prints and performing a development after exposure. Moreover, according to the lithography approach using the lithography version original edition of this invention, it can print by equipping a printing machine as it is, without performing a development after exposure.

[Translation done.]